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Fuglevand's "Support Member" Is Not A Bipolar Separator Plate (Applicable to All Claims)

All claims of the present invention require a "bipolar separator plate," but Fuglevand has none.

The examiner has identified Fuglevand's "support member" 20 as a bipolar separator plate, but this is incorrect. A bipolar plate is defined as a:

Conductive plate in a fuel cell stack that acts as an anode for one cell and a cathode for the adjacent cell. The plate may be made of metal or a conductive polymer (which may be a carbon-filled composite). The plate usually incorporates flow channels for the fluid feeds and may also contain conduits for heat transfer.

Fuel Cell Glossary (2nd Ed., 2000, US Fuel Cell Council, copy attached as Exhibit A). Thus, a bipolar plate must conduct electricity, and it must act as an anode for one cell and a cathode for the adjacent cell. Fuglevand's "support member" does neither, and therefore it is not a bipolar separator plate.

Fuglevand repeatedly states that its "support member" is *not* conductive. When introducing the support member, Fuglevand states that "the module 11 includes a *nonconductive*, dielectric support member generally indicated by the numeral 20." (3:33 - 35) (emphasis added). And throughout the patent, Fuglevand states that the support member is "nonconductive" or "dielectric" . (See 7:41: "*nonconductive* support plate", claim 11: "electrically *nonconductive* support member", claim 12: "electrically *nonconductive* support member", claim 41: "electrically *nonconductive* support member", claim 52: "*nonconductive* support member", claim 53: "*nonconductive* support member", claim 71: "*dielectric* support member." (emphasis added on each)). Fuglevand's support member therefore cannot be a BSP because it is nonconductive.

¹ "Dielectric" is defined as "a nonconductor of electricity." Webster's New Riverside University Dictionary (1984).

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Second, as shown in Fig. 3, Fuglevand's nonconductive support member is not in contact with the MEA of the adjacent cell. Fuglevand's nonconductive support member can hardly act as anode or cathode for an MEA which it does not contact.

Instead, the nonconductive support member is simply a support for the conductor plates 50 and the cathode current collectors 60. As seen in Figure 3, conductor plates 50 are placed on each side of Fuglevand's nonconductive support member 20, and cathode current collectors 60 are placed on the outside of the conductor plates 50, opposite the nonconductive support member 20. See also Fig. 4. Fuglevand further states, referring to Figures 1, 3, 6, 9 and 10 that "[t]he ion exchange membrane fuel cell module 100 [should be 10] further has a support member 20 disposed between the pair of membrane electrode diffusion assemblies 100, and wherein the cathode side 102 of each of the membrane electrode diffusion assemblies faces the support member" (13:28-33). If the cathode sides 102 of the membrane electrode diffusion assemblies 100 are facing the support member 20 and cathode current collectors 60 and conductor plates 50 are interposed between the cathode sides 102 of the membrane electrode diffusion assemblies 100 and the support member 20, the support member cannot "act as an anode for one cell and a cathode for the adjacent cell."

Thus, there is no way to avoid the conclusion: Fuglevand's support member 20 is not a BSP, and therefore all claims of the present application, which require a BSP, are now allowable.

Fuglevand's "Contacts" 70 Are Not Attached to the Supposed Bipolar Separator Plate (Applicable to all claims)

All the claims are allowable for a separate reason: Fuglevand's contacts are not even attached to the supposed bipolar separator plate.

Each of the currently pending claims requires "independently-acting compliant electrical contacts attached to said bipolar separator plate," or variants thereof.

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But in Fuglevand, the contacts 70 are not attached to the supposed bipolar separator plate 20, but instead are integrated with a "cathode current collector" 60, which in turn rests on "individual conductor plates 50." (See Fig. 3, 4;19 - 22). Fuglevand never describes the contacts 70 as being attached to the support member 20, and thus even if the support member were a bipolar separator plate, it would not have contacts attached to it, as required by the present claims.

Nor can Fuglevand's conductor plates be compared to bipolar separator plates, since the examiner in this case issued a restriction requirement between the claims that had bipolar separator plates, and those that covered a "non-bipolar separator fuel cell assembly." (See Restriction Requirement, dated February 24, 2003).

In response to that restriction requirement, the applicant elected -- without traverse -- to proceed on those claims that had bipolar separator plates. Having found that fuel cell assemblies that have bipolar separator plates are "patentably distinct" from those that do not, the examiner cannot now rely on non-bipolar references to reject claims that include bipolar separator plates.

Fuglevand Does Not Disclose a Fuel Cell Stack (Applicable to claims 2, 19)

Fuglevand also does not disclose a fuel cell "stack," as required by claims 2 and 19. As proved by the attached declaration of Jerryold Franklin, Ph.D., those skilled in the art would understand that the term "stack" refers to an assembly of fuel cells in which a bipolar separator plate acts as an anode for one cell and a cathode for the adjacent cell. (Franklin Decl. ¶ 4)

Fuglevand itself confirms this definition, since it repeatedly distinguishes its "modular" assembly from "stack-like fuel cell devices." (Fuglevand 14:14). Thus, Fuglevand remarks that the invention is an "an ion exchange membrane fuel cell which achieves the benefits to be derived from the aforementioned technology, but *which avoids the detriments individually associated with stack type fuel cell designs*" (Fuglevand 1: 39 - 43) (emphasis added). Fuglevand also contends that its device can be quickly repaired with "simple hand tools," while repair of "prior art *stack* arrangements . . . may take

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hours to accomplish. " (Fuglevand 9: 34 - 37) (emphasis added).

Thus, Fuglevand itself makes clear that it does not employ a stack. Therefore claims 2 and 19 are allowable for the additional reason that they include the limitation of a fuel cell stack.

Fuglevand Does Not Disclose a Stack in Which the Electrical Contacts of a First Assembly are in Contact with the MEA of a Second Assembly (Applicable to claims 2, 19).

Even if Fuglevand's assembly could somehow be considered a stack, it clearly does not have "independently-acting compliant electrical contacts of said first assembly . . . in electrical contact . . . but . . . not permanently attached to the membrane electrode assembly of said second assembly," as required by claims 2 and 19.

Instead, as shown best in Figs. 2 and 10, Fuglevand's contacts are all within one module -- they do not contact the adjacent module. Nothing in Fuglevand suggests that the contacts of *one module* 70 are in electrical contact with the MEA of *another module*. Therefore, Fuglevand simply does not anticipate or render obvious claims 2 or 19, which clearly require this arrangement.

IDS

The applicants submitted an IDS on February 6, 2004, but have not received an initialed copy showing that the examiner has considered these references. Pursuant to MPEP 609, the applicants respectfully request that the examiner send an initialed copy of the February 6, 2004 IDS to the applicants at his earliest convenience.